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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,572	01/30/2004	Susan Swindlehurst	003424.P056X	8400

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EXAMINER

GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/769,572	Applicant(s) SWINDLEHURST ET AL.	
	Examiner David E. Graybill	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8 pages</u> . | 6) <input type="checkbox"/> Other: _____ |

In view of the newly discovered references, and to continue to afford applicant the benefit of compact prosecution, the restriction requirement filed on 7-12-5 is withdrawn.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claim 57 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim 42 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Specifically, it is inherent that the conductive medium of claim 41 is any one of an isotropic and an anisotropic (i.e. not isotropic) material.

Claim 57 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The undescribed subject matter is the entirety of the claim.

In the rejections *infra*, generally, reference labels are recited only for the first recitation of identical claim elements.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 25 and 26 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Zafrany (6677186).

At column 2, lines 62-65; and column 3, line 36 to column 5, line 46, Zafrany discloses a method comprising: attaching a first conductor 12 of a first substrate 1, 2 containing a functional block 10 to a second conductor 6 of a large-scale component 6, the functional block being embedded in a first substrate 1, 2 and being electrically connected to the first conductor, and the large-scale component being formed on a second substrate 5; the first conductor being attached to the second conductor using one of thermosonic bonding and thermocompression bonding; each of the first conductor and the second conductor being independently made out of any one of a metal, a

thermoplastic material, and a thermosetting material; wherein any one of or both of the thermoplastic material and the thermosetting material is inherently conductive.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany as applied to claim 25, and further in combination with Neuhaus (6853087).

Zafrany does not appear to explicitly disclose dispensing a plurality of small and sharp particles into the material used to make one of the first conductor and the second conductor to create a mechanical interlock to enhance the attachment between the first conductor and the second conductor.

Still, at column 13, line 9 to column 18, line 17; column 19, lines 6-42; column 21, line 9 to column 23, line 8; column 28, lines 1-21; and column 33, line 66 to column 35, line 49, Neuhaus discloses dispensing a plurality of small and sharp particles 218 into the material used to make one of the first conductor 220 and the second conductor 214 to create a mechanical interlock to enhance the attachment between the first conductor and the second conductor. Furthermore, it would have been obvious to combine this disclosure of Neuhaus with the disclosure of Zafrany because it would enhance the attachment between the first conductor and the second conductor of Zafrany.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany as applied to claim 25, and further in combination with Chang (20030232174).

Zafrany does not appear to explicitly disclose dispensing the functional block into the first substrate using fluidic self assembly.

Nevertheless, as cited, Zafrany discloses dispensing the functional block into the first substrate using "any known technique." Furthermore, at column 16, lines 53-65, Chang discloses dispensing the functional block 330 into the first substrate 32 using fluidic self assembly. Therefore, it would have been obvious to combine this disclosure of Chang with the disclosure of Zafrany because it would facilitate provision of the "known technique" of Zafrany.

Claims 29, 30, 32 35-40 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zafrany (6677186) and Zandman (20010000631).

As cited supra, Zafrany discloses the following:

A method comprising: attaching a first conductor being made of a material to an integrated circuit 10 embedded in a first substrate, the first conductor electrically connected to the integrated circuit; and attaching a large-scale component to the first conductor, the large-scale component electrically connected to the first conductor, and the large-scale component formed on a second substrate; embedding the integrated circuit in the first substrate; wherein attaching the first conductor to the integrated circuit is accomplished by any one of screen printing, flatbed and rotary screen printing, stencil printing, ink jet printing, gravure printing, flexographic printing, pad stamping, electrostatic printing, dispensing through a needle

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and pipette, laminating, hot pressing, laser assisted chemical vapor deposition, physical vapor deposition, shadow masking, evaporating, extrusion coating, curtain coating, and electroplating.

A method comprising: embedding an integrated circuit into a first substrate and disposing a first conductor on the first substrate, the integrated circuit electrically connected to the first conductor, the first conductor being made of a material; and electrically coupling a large-scale component having a second conductor to the integrated circuit, the second conductor being electrically coupled to the first conductor to electrically couple the large-scale component to the integrated circuit, the large-scale component including a second substrate; wherein any one or both of the thermoplastic material and the thermosetting material is inherently conductive; coupling the second conductor directly to the first conductor wherein an active surface of the integrated circuit faces the second conductor; wherein an active surface of the integrated circuit faces the second conductor; wherein the thermoplastic material has conductive fillers "metallic particles"; wherein the thermosetting material has conductive fillers; wherein the integrated circuit is a circuit suitable for use with radio frequency, display, sensor, or phase array antenna applications; wherein the large-scale component includes an antenna, an electronic display, a display electrode, a sensor, a power source, a memory device, and a logic device

formed on that second substrate; wherein the antenna is part of the second conductor.

However, Zafrany does not appear to explicitly disclose the first conductor being made of a thermoplastic or a thermosetting material.

Nonetheless, as cited, Zafrany discloses the first conductor being made of a conductive polymer. In addition, at paragraph 53, Zandman discloses a conductive polymer conductor made of a thermoplastic or a thermosetting material. Moreover, it would have been obvious to combine this disclosure of Zandman with the disclosure of Zafrany because it would facilitate provision of the conductive polymer conductor of Zafrany.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany and Zandman as applied to claim 29, and further in combination with Chang (20030232174).

Chang is applied for the same reason it is applied to claim 28.

Claims 33, 34, 41, 42, 44 and 48-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zafrany and Zandman as applied to claims 29 and 35, and further in combination with Neuhaus (6853087).

Zafrany and Zandman does not appear to explicitly disclose attaching a conductive medium to a the first conductor, attaching the conductive medium to a second conductor included with the large-scale component to interconnect the integrated circuit to the large-scale component; using one

of thermosonic bonding and thermocompression bonding to facilitate the attaching of the conductive medium to any one of the first conductor and the second conductor; disposing a conductive medium on the first conductor to interconnect the first conductor to the second conductor of the large-scale component; wherein the conductive medium is any one of an isotropic material and an anisotropic material; wherein the conductive medium is any one of a polymer carrier having conductive particles, an inherently conductive thermoplastic material, a thermoplastic material having conductive particles, an inherently conductive thermosetting material, a thermosetting material having conductive particles, a conductive polymer, a carbon-based conductor, a carrier having conductive fibers, a carrier having conductive carbon nanotubes, a pressure sensitive adhesive having conductive fillers, and a solder; disposing a non-conductive adhesive between the first conductor and the second conductor and either selectively rupturing a predetermined portion of the non-conductive adhesive to allow for contact between the first conductor and the second conductor, or bringing the first conductor and the second conductor sufficiently close to enable capacitive coupling of the two conductors through the non-conductive material; wherein crimping or pressing is used to rupture the predetermined portion of the non-conductive adhesive; forming an edge-seal around the edges of the first conductor and the second conductor to hold the first

conductor and the second conductor in intimate contact; dispensing a plurality of small and sharp particles in one of the first conductor or the second conductor, the particles to create a mechanical interlock between the first conductor and the second conductor when the first conductor and the second conductor are placed in immediate contact with one another; wherein at least one of the first conductor and the second conductor is made of a thermosetting or a thermoplastic material; wherein the particles are coated with a conductive material; forming an edge-seal around the edges of the first conductor and the second conductor; dispensing a plurality of small and sharp particles in one of the first conductor and the second conductor to enhance contact to the first conductor or the second conductor; forming a conductive medium on the first conductor to interconnect the first conductor to the second conductor and dispensing a plurality of small and sharp particles in the conductive medium.

Notwithstanding, as cited *supra*, Neuhaus discloses attaching a conductive medium 1114 to a the first conductor 1104, attaching the conductive medium to a second conductor 1128a included with the large-scale component 1128 to interconnect the integrated circuit 1100 to the large-scale component; using one of thermosonic bonding and thermocompression bonding to facilitate the attaching of the conductive medium to any one of the first conductor and the second conductor;

disposing a conductive medium on the first conductor to interconnect the first conductor to the second conductor of the large-scale component; wherein, inherently, the conductive medium is any one of an isotropic material and an anisotropic material; wherein the conductive medium is a carbon-based "diamond" conductor; disposing a non-conductive adhesive 1124 between the first conductor and the second conductor and either selectively rupturing a predetermined portion of the non-conductive adhesive to allow for contact between the first conductor and the second conductor, or bringing the first conductor and the second conductor sufficiently close to enable capacitive coupling of the two conductors through the non-conductive material; wherein crimping or pressing is used to rupture the predetermined portion of the non-conductive adhesive; forming an edge-seal around the edges of the first conductor and the second conductor to hold the first conductor and the second conductor in intimate contact; dispensing a plurality of small and sharp particles 1114 in one of the first conductor or the second conductor, the particles to create a mechanical interlock between the first conductor and the second conductor when the first conductor and the second conductor are placed in immediate contact with one another; wherein the particles are coated with a conductive material; forming an edge-seal 1124 around the edges of the first conductor and the second conductor; dispensing a plurality of small and sharp particles in one of the

first conductor and the second conductor to enhance contact to the first conductor or the second conductor; forming a conductive medium 1116 on the first conductor to interconnect the first conductor to the second conductor and dispensing a plurality of small and sharp particles 1114 in the conductive medium. Furthermore, it would have been obvious to combine this disclosure of Neuhaus with the disclosure of Zafrany and Zandman because it would facilitate coupling between the conductor and component.

Claims 35 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karpman (6448109) and Chang (5707902).

At column 2, line 63 to column 5, line 15, Karpman discloses a method comprising: embedding an integrated circuit 6 into a first substrate 2 and disposing a first conductor "bump" on the first substrate, the integrated circuit electrically connected to the first conductor, the first conductor being made of a material; and electrically coupling a large-scale component "MEMS" having a second conductor 32 to the integrated circuit, the second conductor being electrically coupled to the first conductor to electrically couple the large-scale component to the integrated circuit, the large-scale component including a second substrate 12.

However, Karpman does not appear to explicitly disclose the first conductor being made of a thermosetting material or a thermoplastic material; disposing a conductive medium on the first conductor to

interconnect the first conductor to the second conductor of the large-scale component; wherein the conductive medium is any one of an isotropic material and an anisotropic material; deactivating the isotropic material in an area that needs not be conductive.

Regardless, at column 7, lines 5-20, Chang discloses the first conductor "composite bump" inherently being made of a thermosetting material or a thermoplastic material; disposing a conductive medium 52 on the first conductor to interconnect the first conductor to the second conductor of the component "substrate"; wherein, inherently, the conductive medium is any one of an isotropic material and an anisotropic material; deactivating the isotropic material in an area that needs not be conductive "the photoresist is then stripped thereby also removing the solder everywhere except on the composite bumps." In addition, it would have been obvious to combine this disclosure of Chang with the disclosure of Karpman because it would result in extremely reliable physical and electrical connections between the integrated circuit element and substrate.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions relevant to the examination of the instant invention.

For information on the status of this application applicant should check PAIR:

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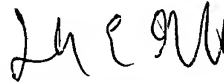
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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (571) 273-8300.



David E. Graybill
Primary Examiner
Art Unit 2822

D.G.
28-Oct-05